

THE REVIEW

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Leaded Steels Airplane Metallurgy Brought to Life— Reduce Cost of Machined Parts

Llewelyn Shows How Lead Acts to Improve Machinability, Its Effect on Properties

By M. A. Hughes

New Jersey Chapter—A near-capacity crowd convened at the Essex House the 20th of March to hear Clyde Llewelyn of Bliss and Laughlin, Inc., Buffalo, N. Y., talk on "The Machinability of Lead-Bearing Steels".

Lead-bearing steels are relatively new, having been introduced about a year and a half ago. This new type of machining steel was developed at Battelle Memorial Institute and was first produced at Inland Steel as an S.A.E. 1115 + 0.25% Pb.

Considerable difficulty was encountered in the early phases of production in getting the lead evenly distributed in the steel. At present, however, there is no excessive segregation of lead as shown from analyses on split ingots.

The lead, in the form of very fine shot, is added uniformly to the mold as it is being poured. Since lead is supposed to be insoluble in steel, it is believed to be present as submicroscopic particles.

Slides showing the effect of lead upon the physical properties were shown. The tests were made on material from adjacent ingots of the same heat, one with and the other without a lead ad-

(Continued on page 5)

Hartford "Monte Carlo" Inaugurates Annual Frolic With Prizes, Entertainment

By R. J. Haigis

Hartford Chapter inaugurated its first annual frolic and get-together on Tuesday, March 14.

Arranged with the idea of promoting a greater feeling of fellowship among the attendance at regular meetings, it was held at the Saengerbund Hall and took the form of a Monte Carlo party.

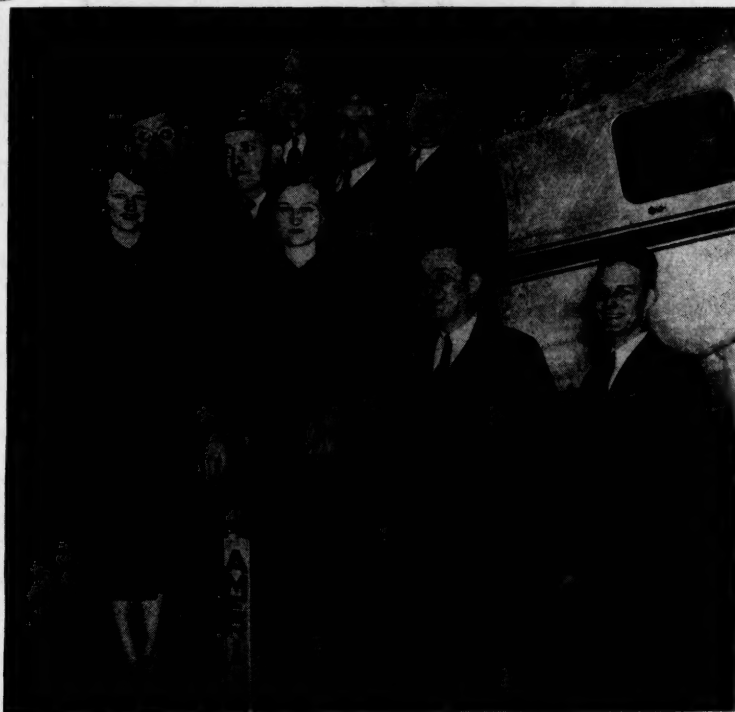
Given a handful of what passed as "legal tender" for the evening, each person was free to make it grow to as large a sum as possible in any manner he saw fit. Poker, dice, slot machines, pin games, wheels of chance—everything was wide open!

At the end of approximately an hour and a half of play, the money was called in and the ones who had been lucky enough to win the biggest amounts were awarded 30 excellent prizes donated by various firms and individuals.

At the conclusion of the games an excellent buffet supper was served and, with everybody mellowed to a satisfactory point, entertainment suiting the occasion was provided.

With the exception of those few poor unfortunates who had to scrub lip-stick off their foreheads before they dared go home, all seemed to enjoy themselves.

Maybe the enthusiasm was not so strong the next morning, but a good time was had while it lasted and by next year the "morning after" will be forgotten!



Cincinnati Chapter Officers Inspect a Transport Plane at Lunken Airport. Back Row—Stanton Olinger, Treasurer of the Chapter; Capt. Elkin Floyd of American Air Lines; George H. Gerdes, Chapter Secretary; Capt. Dale Dryer; Kurt Siems, Chapter Chairman. Front Row—Gladys Kraus and Lois Murrell, Stewardesses; J. B. Caine, Vice-Chairman; Elmo Coon, District Sales Manager.



At the Dinner—J. B. Caine, Lois Murrell, H. J. Fischbeck, Kurt Siems.



Compliments

To George A. (Whitey) Maurath and his loyal organization (Maurath, Inc., Cleveland) who worked 24 hr. for two days to fill an order for 3500 lb. of stainless steel electrodes for shipment to Arabia. It arrived in Brooklyn by truck just 55 min. before sailing time!

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To the officers of the York Chapter, who made it possible for I. Lamont Hughes, former president of Carnegie Steel Co. and now secretary of highways for the State of Pennsylvania, to combine a scheduled broadcast with a coffee talk at the York Chapter meeting on April 13, which went over the air on a state-wide hook-up.

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To John J. Crowe, research engineer for Air Reduction Sales Co., on the award of the Morehead Medal of the International Acetylene Association.

Cincinnati Chapter Inspects Planes, Hear Fischbeck

28 Win Free Flights in American Air Lines Transport Planes; Ladies Attend Meeting

By Kurt Siems

Cincinnati Chapter—The most outstanding event of the 1938-1939 season so far for general interest was the regular meeting on March 9, held at the Lunken Airport in Cincinnati, through the cooperation of the district sales manager of the American Air Lines, Mr. Elmo Coon.

Attendance at the dinner was 106 and this was augmented for the technical lecture to a total of approximately 150.

The meeting was a memorable event in the history of the Chapter because for the first time in its 20 years' existence, ladies were invited to participate, as well as such boys and girls of the members and guests who are interested in and fascinated by this newest means of transportation—aviation.

Exhibits and table decorations were supplied by the American Air Lines, who also sponsored two 15-min. flights over the city in one of their 14-passenger transport planes, to the delight of 28 of those holding the winning tickets, most of whom had not been in a plane before.

A large group availed themselves of the opportunity to inspect the hangar and other operating departments.

Airplane Motors Explained

The American Air Lines were represented at the dinner in addition to Mr. Coon, by two of their stewardesses and two of their flag-ship captains. Much of the success of the evening might be attributed to this fine cooperation on the part of the local management of the Air Lines.

The technical talk was given by H. J. Fischbeck, chief metallurgist of the Pratt & Whitney Aircraft Corp., Hartford, Conn., who spoke on "Metallurgy of Aircraft Parts".

Not only did Mr. Fischbeck deliver an excellent talk incorporating brief references to early and late design airplane motors, but his detailed descriptive explanation of the slides shown was delivered in a most interesting manner, understandable to all.

The short moving picture at the end of his talk showing a "cut-away" Pratt & Whitney airplane motor in motion as prepared for exhibition purposes was an outstanding piece of work and a fitting climax to a most enjoyable evening.

Closing Date for Papers

All members of the Society are cordially invited to submit technical papers to the Publication Committee for its consideration for presentation before the National Metal Congress in Chicago next fall.

Papers should be sent to the National Office in Cleveland to the attention of Ray T. Bayless, assistant secretary, American Society for Metals, not later than June 26, 1939.

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Cannon Plant Visited In Arsenal Inspection

By C. B. Brodie

Schenectady Chapter on March 21 had the privilege of holding one of its best attended meetings at the Watervliet Arsenal, Watervliet, N. Y.

The program, arranged by Captain Willink of the Arsenal, provided a rare opportunity to visit the Army cannon plant, where small anti-aircraft guns as well as large 16-in. cannons are in the making.

It was shown that large guns are not made from a single piece of metal but from a number of tubular forgings machined to the utmost precision and shrunk together in much the same way the old wagon maker shrunk a tire on a wheel. The concentric shells are machined with such precision that the tools used must be kept razor sharp.

A very interesting talk on measuring and gaging was given after which there was an instructive tour of the gage department. The various instruments used to maintain accurate fits of less than 0.001 in. were shown and precise measurements of a millionth of an inch were demonstrated.

The excellent manner in which the large group of persons was handled gave everyone an opportunity to see what he was most interested in and ask questions of the Arsenal men who were scattered through the group.

Mahoning Valley Chapter Has National Officers Night

By J. A. Smail

Mahoning Valley Chapter held a dinner meeting on March 14 at the Elks Club, as "National Officers' Night".

L. D. Woodworth, Chapter vice-chairman, opened the meeting. After a few introductory remarks he called on Past-President R. S. Archer to introduce and present the speakers.

Secretary Eisenman was first, and in his usual way put the audience in a cheerful and relaxed mood. He impressed us with the explanation of how much we get in return for our regular dues, which are only one-third of the Society's cost per member.

President Woodside then traced the early development of alloy steels, and finished with his well-known sound picture. History in steel subjects is always interesting, but to be told of this history by the one who helped make it added considerably to the enjoyment.

Gas-Steel Equilibria Featured at Chicago Seminar Discussion

De Coriolis Is Guest Speaker;
Discussers Contribute Ideas

By Arnold L. Rustay

Chicago Chapter — The February seminar centered about guest speaker E. G. de Coriolis' discourse on gas-steel equilibria. The essential facts presented by him are contained on the data sheet entitled "Equilibria for Gas-Steel Reactions", METAL PROGRESS, 1938 Reference Issue, p. 376.

For the purpose of the discussion, furnace atmospheres were defined as either carburizing, neutral, or decarburizing depending on their reaction with a given steel at some fixed temperature. Practical heat treatment usually requires either a carburizing or a neutral atmosphere.

For successful carburizing, oxygen in some form is required since elemental carbon, as such, is neutral. The important components of the usual carburizing gases are the carbon oxides and certain aliphatic hydrocarbons.

Both pack carburizing and gas carburizing depend upon proper gas-steel equilibria for efficient operation.

The speaker observed, in referring to neutral atmospheres, that as yet, no universal atmosphere has been developed for the scale-free heat treatment of steel. An atmosphere, in order to be neutral, must approach equilibrium with the surface of the metal being treated before carbon has been added to or removed from the steel. The mixture of gases that will accomplish this is a function of the carbon content of the steel, the temperature range during heat treatment, and the chemical composition of the steel with respect to elements other than carbon.

One of the discussers cited experiments in which carefully purified and dried nitrogen gas was used as an atmosphere for the treatment of high speed steel. Under the conditions that prevailed, the nitrogen atmosphere was not inert. Steel treated by this method was generally lower in hardness, beneath the surface, than the same steel treated in the usual manner.

In relation to the treatment of copper, the slightly reducing atmosphere often used for the heat treatment of steel may have ruinous effects on copper and its alloys, due to the reduction of grain boundary copper oxide. Intergranular cohesion is destroyed and the metal crumbles.

An analysis of the ideas contributed to the seminar emphasizes the fact that atmosphere control, like most metallurgical questions, is dependent upon so many variables that each new problem must be solved by empirical methods.

Crampton Tells of Fabricating Copper To Strip, Rod, Wire, Tube, Extruded Forms

By W. P. Goepfert

New York Chapter—Dealing principally with the processes involved in changing copper alloys from the ingot form to the finished stock products, D. K. Crampton, director of research, Chase Brass & Copper Co., addressed the March 13 meeting on "The Fabrication of Copper Base Alloys".

He considered in detail the different methods used in the production of strip, rod, wire, tube and extruded forms.

The bulk of copper alloys for casting in chill molds, later to be wrought, is melted in low frequency core-type electric furnaces although the high frequency coreless furnace may be used for certain difficult alloys.

Induction Furnaces Preferable

Induction furnaces are simple and economical and better suited to copper alloy melting than arc furnaces. The weight per heat varies from 600 to about 2000 lb. the average being perhaps 1200 lb.

Water-cooled molds, either of copper or copper faced, are much more satisfactory for large and medium castings than ordinary iron molds. The surfaces are perhaps no better initially but are preserved in good condition over a long period of time, and the control of temperature has decided advantages in casting.

In rolling of sheet and strip, there is

an increased tendency to use hot rolling as a starting procedure instead of the older practice of cold rolling all the way from cast slabs. In general, where alloys are amenable to such treatment, some improvement in quality and economy results from hot rolling.

For the intermediate rolling operations, there is an increased tendency to use four-high mills which are capable of giving greater reductions per pass and producing metal of less variation in thickness from edge to center.

Rods are produced by any one of three starting procedures; namely, hot rolling, cold rolling and extrusion.

For the softer alloys, hot rolling is most economical. For other hot workable alloys and all intricate shapes, extrusion is the only logical procedure. For certain alloys not well suited to hot working, cold rolling is used.

Four Procedures for Tubes

Tubes are produced by four different starting procedures; namely, shell casting, cupping, extrusion and piercing. In all cases they are given further operations of cold drawing or by means of tube reducers.

In general, the choice of a starting and intermediate procedure is determined by economics, any of the procedures giving high quality material.

In annealing there is a considerable trend toward controlled atmospheres, particularly those giving bright anneals, the essential requirements being the elimination of oxygen and in some cases the elimination of moisture and carbon dioxide. These atmospheres are preferably obtained by combustion of city, natural or producer gases or by cracking and partial combustion of ammonia.

Coast-to-Coast Congress Is Sponsored by S.A.E.

Aircraft, aircraft engines, and their fuels will be treated in almost one third of the 60 technical papers to be presented at the coast-to-coast 1939 World Automotive Engineering Congress of the Society of Automotive Engineers.

Of the 18 technical papers on aeronautical subjects, 10 will be presented by European authorities who are making a special trip to America to appear before the Congress, according to John A. C. Warner, secretary and general manager of the Society.

The Congress opens May 22 in New York for a five-day session, will be in Indianapolis May 29 to 30, in Detroit May 31 to June 2, and closes with a three-day session in San Francisco, ending June 8.

Advanced engineering design problems of aircraft, automobiles, trucks, buses, railcars, the role of tractors in our national economy, operating problems of fleet owners, and exhaustive reports on fuels and lubricants developments will be covered by the Congress, Mr. Warner pointed out.

Members of the American Society for Metals are cordially invited to participate in the Congress.

Archer's Talk on Hardenability Rates As Tops at Boston

By A. J. McDuff

Boston Chapter — Discussing the hardenability test for steel, Past President Robert S. Archer gave an exposition of a technical subject that rated as tops at the meeting on Feb. 3.

The large turnout of some 175 members was rewarded with an excellent review of the history of hardening and a detailed survey of present knowledge of hardening.

The need was stressed for a test that will reveal early in the processing the hardening characteristics of the finished product. The fundamental viewpoint was that the hardenability test must be reproducible, sensitive, inexpensive, rapid, easy to carry out with a minimum of equipment and the results must be easy to record and to explain.

The papers given at the 1938 A.S.M. Symposium on Hardenability were carefully intercompared and differences and likenesses pointed out in detail. (See Mr. Archer's articles in METAL PROGRESS for January, February and March.)

The coffee talk was given by Walter M. Saunders of Providence, R. I., a member of the Boston Chapter, who described and showed his beautiful colored motion pictures illustrative on the one hand, of the cranberry industry of Cape Cod, and on the other hand, of the changes in flowers as they pass from the bud to the bloom and then wilt. The latter pictures were taken at the remarkably slow rate of 1 frame per 5 to 30 min.

This being the first regular meeting since the death of Dr. Albert Sauveur, tribute was paid to his memory.

Speakers and Officers—Boston Meeting



At Boston February Meeting—Lou Geerts, Chairman, Membership Committee; A. L. Knight, Vice-Chairman, Boston Chapter; R. S. Archer, Technical Speaker; W. M. Saunders, Coffee Speaker; R. F. Harrington, Chairman, Program Committee; H. E. Handy, Secretary, Boston Chapter.

Three Activities Feature Busy Month in L. A.

Regular and Special Meeting, Five-Day Lecture Course Are Held During February

By James Patterson

Los Angeles Chapter—The month of February, with two meetings and an educational course, was an active one for the Los Angeles members.

The regular monthly meeting on Feb. 16 was a joint meeting with the Los Angeles Chapter of the American Foundrymen's Association.

Two motion pictures were shown through the courtesy of the Aluminum Co. of America. The first, entitled "Aluminum: Mine to Metal", described the mining of bauxite, the manufacture of alumina, and the production of aluminum.

Three Movies Shown

The picture pointed out many instances where aluminum has replaced other metals because of its lightness, resistance to corrosion, ability to conduct heat and electricity or reflect light and heat, or workability.

The second, entitled "Aluminum Fabricating Processes", after showing the many basic aluminum products, portrayed in some detail the processes by which the metal is rolled, drawn, extruded, cast and forged. It described briefly a number of methods employed in forming and assembling aluminum structures.

A talking picture entitled "The Story of the Chilled Car Wheel" was then presented through the courtesy of the Griffin Wheel Co., Los Angeles.

The picture followed through the various steps in the production processes beginning with the preparation of scrap wheels for the cupola, through the preparation of the molds, manufacture of cores, and the shaking-out and pitting of the castings, to their final finishing on the boring mill.

It also showed a number of operations in the well-equipped research laboratory maintained by the Association of Manufacturers of Chilled Car Wheels who produced the film.

Preceding the picture, A. J. Troja, superintendent of the Los Angeles plant of the Griffin Wheel Co., referred to some of the problems encountered and later answered questions.

Burns George Gives Tool Steel Course

During the week of Feb. 20 to Feb. 24 the Los Angeles Chapter presented an educational course on "Tool Steels". The lectures were delivered by R. Burns George, metallurgical engineer, Vanadium-Alloys Steel Co., Latrobe, Pa., using James P. Gill's book on "Tool Steels" as a text.

At the conclusion of each of the five lectures, those attending were given the opportunity of discussing their metallurgical problems with Mr. George. The course had an enrollment of 95.

Concluding the month's activities was a special meeting on the evening of Feb. 28. The Chapter was honored to have as its guest speaker, H. J. French, in charge of alloy steel and iron development, for the International Nickel Co., Inc., New York City.

Mr. French very ably presented a talk on "Recent Progress in Alloy Steels" which has been reported in previous issues of THE REVIEW.

His talk was accompanied with slides showing physical property charts on nickel alloy steels, and pictures illustrating the many uses of nickel steels.

Sauveur Night Celebrities at Philadelphia



Caught in Informal Speaking Poses at Philadelphia's Annual Meeting Honoring Albert Sauveur and Sustaining Members: Above—H. C. Knerr, V. N. Krivobok, Joseph Winlock. Below—Chapter Chairman A. O. Schaefer and Speaker Krivobok; R. P. Wilson and F. Tatnall.

Krivobok Lives Up to Sauveur Night Tradition

Presents System of Classifying Alloying Elements and Steels With Flawless Logic

By A. O. Schaefer

Philadelphia Chapter—Added solemnity was given the Sixth Annual Sauveur Night, held Feb. 24, by the recent passing of the man for whom the meeting was named.

Many of those present recalled the meeting just one year ago which was addressed by Professor Sauveur himself, but all agreed that the memory of that great scientist and friend was kept alive as he would have it kept—by a gathering of congenial metals men, and by a discourse of the finest scientific standards.

Certainly Dr. V. N. Krivobok in his talk entitled "Evaluation of Alloying Elements in Carbon and Complex Steels" fully lived up to the tradition of these great meetings.

A feature of Dr. Krivobok's talk is his system of classifying alloying elements, and the steels they form. His data are drawn from many sources, and contain some hitherto unpublished experiments. It is rendered peculiarly valuable by the flawless logic with which the speaker develops his thoughts on the subject.

As an added feature of the talk, Dr. Krivobok appended a tribute to Professor Sauveur which was notable for its sincerity and depth of feeling.

Sustaining Members Take Bows

At the close of the meeting, Dr. Krivobok was presented with a scroll testifying to his appearance before the Philadelphia Chapter as a Sauveur night speaker.

The dinner preceding the meeting was set aside as an occasion for the Chapter to express its appreciation of the value of sustaining members. Representatives of Philadelphia's 29 such members were ranged at the speakers' table for all to see. These representatives were not called upon for 29 speeches, but they were called upon for 29 bows, which they all did very nicely.

Dinner was further enlivened by a demonstration of magic from a former president of the Amateur Magicians' Association, Malcolm Wright, who is now advertising manager of the Baldwin Locomotive Works.

The facilities of the Manufacturers and Bankers Club of Philadelphia forced Mr. Wright to display his art from a balcony. Unhindered by this handicap, he mystified the large dinner crowd with a very creditable assortment of tricks.

Wiedemann Honored

The meeting was also noteworthy in that resolutions were adopted relative to the recent death of Theodore Wiedemann. Mr. Wiedemann had long been active in Philadelphia Chapter affairs, and was the donor of the Chapter Library.

The tradition of Philadelphia's Annual Sauveur Night has been developed for six years to a unique position in the Chapter's program, and that of the National Society. On two occasions Dr. Sauveur was the speaker. Others include E. C. Bain, H. J. French, and N. L. Mochel.

The memory of our great friend will never die. It will be fittingly carried on by meetings such as that held this year on Feb. 24, and so stirringly addressed by Dr. Krivobok.

Hot Quenching of Cast Iron Comparable to Austempering of Steel, Says Bartholomew

By Walter M. Saunders, Jr.

Rhode Island Chapter—At the March 1st meeting E. L. Bartholomew, chief metallurgist of the United Shoe Machinery Corp., Beverly, Mass., spoke on "Hot Quenching of Cast Iron", a field pioneered and developed to an astonishing degree by the speaker.

Comparable to austempering of steel in actual practice, the process applied to cast iron is not limited by such small sections as with steel.

In fact, standard cast iron tensile bars machined from a 1.2-in. arbitration bar hot quenched at 550° F. showed austenite at the center, and gave a tensile strength of 47,000 psi., in contrast to the as-cast strength of a duplicate bar of 40,000 psi. If an additional heat treatment at 650° F. is given the same bar hot quenched at 550° F., the strength increases to 56,000 psi. with a Brinell of only 352 (Brinell 375 by the hot quench alone).

Mr. Bartholomew has worked chiefly with cupola irons, the analysis of which runs about 3.50% total carbon, 1.75% silicon, and sometimes 2% nickel.

It is claimed that retained austenite is responsible for the unusual wearing qualities of hot quenched irons, and results on cams obtained on a breakdown machine of original design confirm this belief, as well as X-ray, and magnetic powder patterns. A cast iron cam hot quenched lasted 105 hr. in this machine, and was not destroyed, while the same cam in the as-cast condition failed after 30 min., and one hardened and tempered in the conventional manner gave only 17 hr. service.

Similar startling results indicate many new applications of cast iron hot quenched by Mr. Bartholomew's method, and projected research on the product promised an answer to many factors still somewhat uncertain.

It was a talk of great interest to the cast iron men present, but at the same time Mr. Bartholomew presented much of value on steel.

Accompanying him to the meeting were fifteen friends from the Boston

Chapter, of which Mr. Bartholomew is past chairman. As things turned out, there was no need for this personal bodyguard, although several of them contributed to the discussion.

At the dinner preceding the meeting, about 50 members heard a highly entertaining coffee talk by "Bun" Cook, manager of the Rhode Island Reds Hockey Team, on "Some Experiences in Professional Hockey". The impression was gained that hockey can be almost as hazardous as steel treating!

French and Zima Answer Questions on Alloy Steels

By G. E. Healy

Oregon Chapter—Eighty-three members and guests were present at the meeting on Feb. 10.

L. P. Byrne reported on the progress of the educational classes, and Colin Chisholm, chairman of the library committee, reported on the nature of the publications to be found at the library.

Chairman Ulrich read a letter from the Cleveland headquarters requesting aid from local members in reporting the solution of odd problems or shop kinks for use in the publications of the Society.

An invitation was extended to the members to inspect the plant of the Davidson Baking Co. on Friday evening, March 17, and 24 members indicated they would attend.

H. J. French of the development and research department of the International Nickel Company was then introduced. Mr. French talked on the subject "Some Recent Progress in Alloy Steels". His talk has been reported in previous issues of THE REVIEW.

Mr. French illustrated his talk with slides showing the uses and effects of alloy steels, and at the conclusion of his talk he and Mr. Al Zima, also of the International Nickel Co., answered many questions asked by those present.

British Professor Discusses Crystals

By George E. Stoll

Notre Dame Chapter—One of the largest local meetings was held on March 8 at the University of Notre Dame. Many out-of-town guests welcomed the opportunity of hearing our gifted speaker of the evening, Dr. Daniel Hanson, Feeney Professor of Metallurgy in the University of Birmingham, England.

Considering the broadness of his highly technical topic and the limited time allotted him, Dr. Hanson covered "The Distortion of Metal Crystals" in a clear and capable manner.

Most metals crystallize in the cubic system, although zinc and magnesium crystallize in the hexagonal, and tin in the tetragonal system. The speaker drew a very clear picture of the atomic planes of crystals—parallel planes so drawn through a crystal that all the atoms constituting it would be located in any one set.

Dr. Hanson pointed out how this

position of the atoms in the crystal determines the space lattice, and explained the formation of the body-centered cubic lattice, the face-centered cubic lattice, and the hexagonal close-packed lattice.

Deformation of metallic crystals occurs along planes of the crystals. This was demonstrated by photomicrographs showing slip lines produced by strains, these slip lines being the result of movement of one crystal plane with respect to the other as the crystal is distorted.

Dr. Hanson concluded with a summary of modern theories of the mechanism of deformation of metallic crystals, and indicated that none of these theories is satisfactory.

Polishing Cannot Be Taught, Must Be Learned Says Vilella

By A. W. Demmler

Pittsburgh Chapter—March 9 was Sustaining Members' Night. Every available seat was occupied for J. R. Vilella's talk on "Recent Developments in Metallography".

Our own Dr. Krivobok served as technical chairman and introduced the speaker without ceremony as Mr. Vilella's ability is too well recognized to require any reference to his training or early experience.

The fundamentals of polishing were discussed and the speaker stressed that polishing cannot be taught; it must be learned. (Dr. Krivobok, during the discussion, said that this statement gave him renewed confidence as a professor.)

Under optics, of course, numerical aperture, iris opening, filters and type of illumination received due attention. Some beautiful slides were presented; these did not include the famous quintuplets although "twins" were shown several times.

Details of Mr. Vilella's talk have been presented in previous issues of THE REVIEW. Following a lively discussion the meeting adjourned with many thanks for a very worth-while evening.

75% of Cutting Tools & Gages Use High Speed

Carbon Steel and Certain Non-Ferrous Metals Constitute Remainder, d'Arcambal States

By Arnold L. Rustay

Chicago Chapter—A. H. d'Arcambal, consulting metallurgist, Pratt & Whitney Co., gave an informal exposition on "Precision Cutting Tools and Gages" on March 9.

Of the materials used for cutting tools and gages, about 75% are made of high speed steel and most of the remainder of carbon tool steel. The small but important remainder includes certain non-ferrous metals.

Carbon steel cutting tools find their principal applications in small taps, punches, and fast finishing operations where light cuts are taken. These carbon steels are usually alloyed with small amounts of vanadium, chromium, or tungsten.

The tungsten high speed steels of today are decidedly superior to those of a decade ago and the speaker stressed the fact that this improvement has not been the result of analysis juggling but has been effected by advances in steel manufacture.

18-4-1 Most Widely Used

The 18-4-1 type is most widely used at present and is an excellent all around steel. The 18-4-2 and cobalt types make the best milling cutters for machining steel harder than 300 Brinell but are somewhat brittle for taps. Mr. d'Arcambal would choose 18-4-2 for most broaches.

The molybdenum high speed steels show promise, but the speaker deplored the tendency of the tool steel mills to promote new analysis steels on the basis of superficial experiments and tests. Progress in the development of these steels will be slow unless steel makers concentrate efforts on a few types instead of adding to the extant 27 varieties.

Tungsten carbide, titanium carbide, boron carbide and stellite have earned a place for themselves because of unique properties where special applications warrant the use of expensive materials.

Plug Gage Illustrates Improvements

The evolution of the cylindrical plug gage illustrates how new materials may be utilized to improve a tool. High carbon, high chromium steel makes a good wear resistant plug gage but is inferior in this respect to the more recently developed chromium plated gage. In turn, the chromium plated gage has been displaced by the very hard boron carbide and cemented carbide gages for certain applications.

Mr. d'Arcambal stated that the lead bath is the best medium for heating carbon tool steels to the quenching temperature. Carbon steels are quenched in a brine for a predetermined length of time and then in oil until cold. The importance of a thorough soak at the tempering heat was emphasized.

Tungsten high speed steels are pre-heated and high heated in electric atmosphere control furnaces and are quenched from 2350° F. The maximum temperature of the tool at high heat must be closely controlled since the ultimate properties of the tool are dependent to a considerable extent on this temperature.

These steels are cooled to room temperature in the quench and are then tempered in the vicinity of 1050° F. The speaker touched on the problem

Illustrates Corrosion Tests by Pasteurized Milk, Oil Industry

By J. H. Wasel

Lehigh Valley Chapter—Aeration, temperature and velocity are the most important factors affecting corrosion, reported F. L. La Que, assistant director of technical service of the International Nickel Co., in a lucid discussion entitled "Corrosion of Metals" at the third meeting this year. In considering standard corrosion tests Mr. La Que found that a single test for corrodibility is not feasible.

The corrosion of oil refinery equipment under high pressure and temperature, for example, is best tested, said Mr. La Que, by the insertion of suitable samples in the equipment and withdrawing them after a suitable period of time. Pilot plants on a small scale are a practical method of corrosion testing.

Pasteurizing milk by heating in nickel pipes developed corrosion at one dairy, explained Mr. La Que, and the method used in testing this corrosion and determining its causes was to build a laboratory apparatus duplicating the condition in the pipes. On heating the milk, no corrosion occurred, but cooling the milk caused corrosive attacks because of the absence of the protective film formed during heating.

Using lantern slides, Mr. La Que described his researches into the effects of aeration on corrosion, and demonstrated that quantitative measurement of corrosion by galvanic cells is not reliable.

The need for standard units of corrosion was stressed.

At the dinner preceding the meeting, the coffee speaker, Major Carter Collins, Commandant of the Lehigh University R.O.T.C., illuminated the subject of "National Defense". Pertinent lessons from the last War formed interesting listening for the young and old members of the Chapter.

New Bridge, Hardenability Are Cleveland Subjects

By L. F. Herron

Cleveland Chapter turned out 130 strong for the usual excellent steak dinner, and a description of the new Main Avenue Bridge, the unusual problems and solutions of its design being most ably and interestingly presented by Fred Plummer, consulting civil engineer.

Following the coffee talk, Hugh Brown turned the meeting over to Gordon Williams, who as technical chairman, gave Marcus A. Grossmann a nice introduction to approximately 450 members and guests, recalling the days when the speaker was a member of the local chapter.

Dr. Grossmann's talk on hardenability has been reported in these columns.

After an interesting discussion period, he was roundly applauded for his lucid explanation of this important contribution to the science of heat treatment.

of machinability and commented on the necessity of good chip clearance when magnesium is machined if overheating and fire is to be avoided.

Sundry gages and cutting tools were shown and applications were discussed in detail.

Applications of the electrolytic gages were outlined and conveyed the impression that the accuracy of these gages is approaching the point where deviations may logically be expressed in Angstrom units.

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Personally autographed by the author, the late Albert Sauveur, Gordon McKay Professor of Metallurgy and Metallography in Harvard University, the "Metallurgical Dialogue" is a unique and informal presentation wherein a master answers his pupil's question as to "why steel hardens when plunged red hot in cold water".

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Gases in Metals May Be Blowholes, True Solution, Compound

Fundamental Laws Governing Gas in Metal Expounded by Dr. Hanson of England

By Walter G. Patton

Detroit Chapter—Dr. Daniel Hanson, professor of metallurgy at the University of Birmingham, England, who gave the principal address at the A.I.M.E. meeting in New York recently, was the speaker at the March meeting.

Dr. Hanson's talk on the subject "Gases in Metals" was enthusiastically received by an audience of over 200.

Purposely limiting his discussion to the fundamental laws governing the presence of gas in metals, Dr. Hanson considered both ferrous and non-ferrous metals. Pointing out that gas may be present in metals as surface gas or blowholes, or it may be in true solution or form a chemical compound, the speaker then discussed each of these phenomena in detail, illustrating his points with slides showing temperature-pressure relationships, equilibrium diagrams and micrographs.

The changes in gas solubility in metal in the molten and solid state and the effect of gas on physical properties, including coefficient of expansion, critical points and electrical conductivity, were cited by Dr. Hanson to show that, in many respects, gases behave much the same as alloying elements.

In explaining the presence of gases in metals, Dr. Hanson traced how gas contamination may start with refining or extracting and continue through practically every step in the melting and pouring process. Careful research has demonstrated conclusively that corrosion and scaling may play a definite part in influencing the amount of gas present in a metal.

A good portion of Dr. Hanson's talk was devoted to a detailed explanation of how gas exists at the surface of metal in the form of molecules and how these molecules are first dissociated into atoms before diffusion in the metal takes place.

The profound influence of water

vapor present in furnace gases and its attendant absorption by the metal as oxygen and hydrogen were also touched upon by Dr. Hanson as a means of explaining significant changes not otherwise accounted for in the properties of metals.

A talking picture, "The First Century of Baseball", was shown to the group immediately following dinner.

No report of the March meeting would be complete without mention of a bit of Ripleyana. The usual door prize of a paid-up A.S.M. membership was won by one of our most paid-up members, Secretary Beckwith. And, just to prove that the age of miracles is only begun, Cliff Snyder then drew his own ticket from Chairman Boegehold's outstretched hands, thereby earning for himself the good-natured acclamation of the crowd and, appropriately enough, a gallon of white paint.

Forgings Are Pre-Eminent In Engineering Materials

By E. O. Millson

Ontario Chapter was very fortunate in obtaining A. O. Schaefer, engineer of tests of the Midvale Company and chairman of the Philadelphia Chapter, as the speaker at its March 3rd meeting.

Mr. Schaefer clearly demonstrated why forgings hold, and will continue to hold their pre-eminent position amongst engineering materials.

Since an article by Mr. Schaefer on this same subject of large forgings appeared in the March issue of METAL PROGRESS, his talk will not be reported here in detail.

A number of interesting slides showed some of the actual forging operations and a few of the many forgings made by Midvale.

Protective Atmospheres Must Be Low Cost And Subject to Exact Control, Says Otis

By J. L. Spence

Montreal Chapter—Protective atmosphere for annealing and heat treating furnaces was discussed in a most comprehensive and scientific manner by Albert N. Otis of the General Electric Co., at the March 6th meeting.

The coffee talk consisted of sound pictures entitled "Excursions in Science". The films were of great interest and illustrated practical and unusual applications to everyday life of recent discoveries in the electrical laboratories. Electron tube control, low temperature effects by means of liquid air, and thickness measurements using electrical gages of such things as thin lacquers, with only one surface exposed, were of special interest.

Mr. Otis compared the early types of apparatus used in producing gases for bright annealing with the present large scale installations producing up to 15,000 cu.ft. per hr.

Protective atmospheres must be low in cost and subject to exact control and composition in order to secure satisfactory products and allow the production of low cost fabrication.

Brazing in protective atmospheres has made possible the fabrication of intricate equipment for electric refrigerators and many similar products.

The analysis of the protective gases controls the brightness of annealed sheet. The methods of producing gases are numerous. Coke oven or natural gas may be burned to complete combustion to secure only traces of carbon monoxide; ammonia gas, city gas or hydrogen gas are alternative sources of raw gas.

The cost of gas generally determines

its use and varies from approximately 10c per M. cu.ft. for coke oven or natural gas to 50c for city gas or as high as \$10 for small quantities of hydrogen gas.

Gases Must Be Dry

It is not easy to find a universal gas for all grades of steel. Nitrogen is an excellent gas but requires the presence of hydrogen to combine with any oxygen which may creep into the furnace.

Gases must be dry when annealing high carbon steel to avoid decarburization. Moisture is one of the worst enemies.

The presence and quantity of moisture are difficult to determine. The old method of determination by means of phosphorous pentoxide was inaccurate and slow and has been displaced by new electrical equipment termed a "dew point potentiometer" which will allow dozens of accurate determinations per day.

The speaker's complete familiarity with properties of gases, equipment for using them and the effects of impurities made him particularly well qualified to present an interesting and instructive talk, which was well illustrated with lantern slides showing the varied types of furnaces and apparatus.

New Lead-Bearing Steels Are Described

(Continued from page 1)

dition. On all the heats so tested the differences in physical properties were so small that they could be attributed to experimental error.

The leaded steels are slightly more shallow hardening. The addition of lead refines the grain by approximately one A.S.T.M. grain size number and this probably accounts in part for the slight difference in hardenability of lead-bearing steel when compared with like material of the same heat without lead.

Slides comparing machine rates and cost per part for lead-bearing steel and non-leaded steels were next shown. Tests on actual production parts compared S.A.E. X-1112 vs. 1115 + Pb, S.A.E. X-1314 vs. 1115 + Pb, and S.A.E. X-1335 vs. X-1335 + Pb.

In every test the lead-bearing steel showed a decided advantage in surface feet cut, parts produced per hour and a slightly lower cost per part. Although the leaded steel showed much better machinability, the additional cost of the leaded steel made the cost per part but slightly lower than the non-leaded steels. This, however, would amount to quite an appreciable saving over a long production run.

The machined surface of the leaded steels is equal and sometimes excels that of bessemer screw stock. The reason for the increased machinability is not clear but is thought to be due to the fine lead particles breaking up the continuity of the ferrite in a manner similar to that of MnS but much more effectively.

It is also thought that the lead acts as a lubricant. This theory is upheld by the fact that the chips are much finer and the tool life is somewhat increased when working lead-bearing steels.

Much interest is being shown in these new steels and it is highly probable that lead-bearing steels will soon enter the tough machining alloy field.

The interest of the audience was indicated by a lengthy discussion, led by Chapter Vice-Chairman E. S. Davenport, that followed the speaker's talk.

A.S.M. Members Invited to Participate in Newly Organized Corrosion Committee

Members of the Society who are interested in corrosion may wish to contribute to the work of the American Coordinating Committee on Corrosion, formally organized on Feb. 17 at the Philadelphia headquarters of the American Society for Testing Materials.

T. S. Fuller, General Electric Co., Schenectady, N. Y., is the representative of the American Society for Metals on the Committee.

Designed to serve as a clearing house and coordinating agency for information on experience and work in progress in the field of corrosion and corrosion prevention, the Committee is made up of representatives of the following organizations:

American Chemical Society
American Electro-platers' Society
American Foundrymen's Association
American Gas Association
American Institute of Chemical Engineers
American Institute of Electrical Engineers
Amer. Inst. of Mining and Met. Engineers
Amer. Soc. of Heating and Ventilating Engr.
American Society for Metals
Amer. Soc. of Refrigerating Engineers
American Society for Testing Materials
American Water Works Association
Battelle Memorial Institute
Electrochemical Society
National Bureau of Standards
Society of Automotive Engineers
Tech. Assoc. of the Pulp and Paper Industry

As its first step the Committee is compiling a list of the names and addresses of those working in the field of corrosion in this country, together with information as to their special interests and their current programs of corrosion studies.

The compilation of such information will serve many useful purposes both to individual workers in the field and to the various technical and industrial organizations that plan and carry out corrosion studies of many kinds.

It is not the purpose of the Coordinating Committee to abstract the literature on corrosion.

Any member of the Society or reader of THE REVIEW who is engaged in corrosion studies and would like to have his name and work appear in the records of the Coordinating Committee is invited to communicate promptly with Mr. Fuller, who will be glad to supply copies of the form upon which their activities and experience may be noted.

Also, members will aid Mr. Fuller by bringing to his attention the names of investigators who are not likely to be reached through a canvass of the membership of any of the cooperating societies listed.

Those interested should address all communications to: Mr. T. S. Fuller, General Electric Co., Schenectady, N. Y.

New 1939 Metals Handbook Is Now Being Distributed

Copies of the new 1939 edition of Metals Handbook are now being distributed to all members of the American Society for Metals in good standing. It is necessary, however, for each member to return his old 1936 edition which is now obsolete. As soon as this copy is received in the National Office, the new edition will automatically be sent free and postpaid.

Return your old Handbook immediately to the American Society for Metals, 7016 Euclid Ave., Cleveland, Ohio, and this new and enlarged reference book will be forwarded promptly.

Eisenman Lectures for President Woodside on History of Alloy Steels

By M. A. Hughes

New Jersey Chapter—A capacity crowd convened at the Essex House the night of Feb. 20 to hear President William Park Woodside's lecture on "Panorama of Alloys in Steel". Through an unavoidable circumstance, Mr. Woodside was unable to present his lecture in person; however, the members and guests did have the privilege of meeting Mr. Woodside as the blacksmith—the character he portrayed in the sound film which was shown at the meeting.

Genial Bill Eisenman, whose duties on President's Night usually consist of reporting A.S.M. activities and progress, relating the latest jokes, and introducing the President, was pressed into service as the speaker of the evening. After disposing of his own duties, Mr. Eisenman very ably presented Mr. Woodside's lecture.

Previous to the technical lecture a sound movie entitled "Conquest of the Hudson" was shown. This picture depicted the planning, construction and operation of the Lincoln tunnel. Sound and camera crews working under the Hudson made a complete record of the construction work.

Free Literature — Mail Coupon Below

Conveyer Handbook

Mathews Conveyer Co. boasts that they can supply a conveyer for handling every kind of container, box, case, carton, crate, barrel, or can, any product or commodity. Their claims are substantiated by a detailed handbook of 384 pages well illustrated by photographs, diagrams, and numerical data. Bulletin R-204.

Friction Materials

A new brochure on friction materials for the Iron & Steel engineer which brings together comprehensive data on brake linings and clutch facings for steel mill equipment is available through Johns-Manville. Bulletin R-100.

Temperature Controllers

A large, well illustrated 48-page book on temperature controllers is offered by The Foxboro Company. Filled with valuable tables, charts and pictures. Bulletin Dc-21.

Carburizing Salt

A technical service bulletin describing a new development—DuPont Carburizing Salt—for the economical production of deep high-carbon cases on plain carbon and alloy carburizing steels... available through DuPont. Bulletin Dc-29.

Contour Sawing

An enlarged and revised 100-page book on Contour Sawing contains case records and complete engineering data on DOALL contour sawing technique. Offered by Continental Machines, Inc. Bulletin Dc-170.

Annealing Atmospheres

An entirely instructive article "Controlled Atmospheres for Copper" has been made available through Continental Industrial Engineers, Inc. Bulletin Dc-154.

Air-Operated Controllers

A representative list of 50 applications where Brown Air-Operated Controllers are saving money are included in an attractive folder just released by The Brown Instrument Co. Bulletin Dc-3.

Thermometer

A Dial-Indicating Thermometer complying with the most exacting industrial requirements on applications dealing in temperatures from 0° F. to 1000° F. is described in a bulletin just released by Wheelo Instruments Co. Bulletin Dc-110.

Vacuum Cleaning

A very colorful brochure which illustrates modern cleaning methods by vacuum in industrial plants has just been released by The Spencer Turbine Co. Bulletin Dc-70.

Lead Bearing Steels

New bulletin describing remarkable new lead-bearing Open Hearth steels which improve machinability from 20 to 40% and increase tool life without sacrificing desirable qualities of OH steels has been released by Joseph T. Ryerson & Son, Inc. Bulletin Dc-106.

Multi-Point Pyrometer

The Alnor Rectangular Type Pyrometer, designed to provide a rugged moderately priced instrument with multi-point switch, is described in a release by the Illinois Testing Laboratories, Inc. Bulletin Dc-180.

Stainless Electrodes

An attractive silver and black Wall Chart packed full of useful information for the welding fabricators of stainless steel and special alloy metals can be obtained through Arcos Corp. Write early since limited supply available. Bulletin Dc-191.

Carburizing Compounds

Aerocarb Carburizing Compounds, the new development of the American Cyanamid & Chemical Corp., are described in literature available through this company. Bulletin Dc-148.

High Speed Steels

Seven grades of high speed steels are thoroughly described in an interesting folder just released by Crucible Steel Company of America. Bulletin Dc-56.

Heat Resisting Castings

A 4-page folder on Pyrasteel, heat resisting castings, that shows applications of special alloy steels and their analyses, also information on welding alloy steels, is available through Chicago Steel Foundry Co. Bulletin Cb-184.

Steelescope

The Spekker Steelescope is a specialized spectroscopic for the rapid estimation of metallic elements in steel. Its use as a reliable workshop instrument is described in an illustrated booklet distributed by Jarrell-Ash Co. Bulletin Dc-96.

Rotoblast

A new blast cleaning machine eliminates the need for compressed air as the abrasive driving agent. Pangborn Corporation tells how a rapidly spinning wheel propels the abrasive by controlled centrifugal force. Bulletin Ox-68.

Panphot Microscope

A universal microscope with photomicrographic reflex camera is explained in this well illustrated booklet by E. Leitz, Inc. Points out applications and advantages of this system. Bulletin Db-47.

Moly Cast Iron

The use of molybdenum in foundry practice, both on steel and cast iron, is described in a handsome booklet by Climax Molybdenum Co., which presents accurate technical information in a striking and modern manner. Bulletin Jy-4.

Tocco Process

This amazing and extremely accurate method of heat treating is described in a four-page leaflet, yours for the asking. Distributed by Ohio Crankshaft Co. Bulletin Oy-145.

Electric Control

A complete control system for regulating input in proportion to demand is described in "Micro-max Electric Control," an illustrated eight-page catalog issued by Leeds & Northrup Co. Bulletin Oy-46.

New Enduro Book

The fruit of a tremendous amount of research on the part of Republic Steel Corp.'s metallurgists is contained in a handsome booklet giving general applications and extensive tabular matter on physical and chemical properties of 13 types of Enduro stainless steels. Bulletin Ny-8.

Flame Hardening

A 10-page illustrated booklet "Flame Hardening" has been published by The Linde Air Products Co. Describes the process whereby the surface of an iron or steel product is locally heated by means of an oxy-acetylene flame and then hardened by rapidly quenching in water, leaving the core of the metal tough and ductile. Bulletin Hb-63.

Heat Resisting

A striking booklet by Driver-Harris Co. has some interesting information and photographs of heat resisting alloys for heat resisting applications. The company makes a wide variety of parts from Nichrome, Chromax and Cimet. Bulletin Cb-19.

Metals for Corrosion

Fourteen varieties of Midvaloy corrosion and heat resisting metals are described in a detailed bulletin by The Midvale Co. Properties and applications are listed and illustrated. Bulletin Ca-160.

Continuous Heat Treating

First literature available on their No. 29-F Heating Machine is now available through the American Gas Furnace Co. Shows picture of machine and gives operating data. Bulletin Bc-11.

Tool Steels

Information about the fine steels made by the Uddeholm Company of America, Inc., can be obtained by requesting their new bulletin. This company controls its output completely from the ore mine to the consumer. Bulletin Eb-196.

Recording, Control Equipment

Now available from Baldwin-Southwark Corp. is a new 16-page bulletin illustrating and describing Southwark's complete line of stress-strain recorders and extensometers. Bulletin Bc-67.

Furnace Experience

Facts developed through 32 years of engineering and building practically every type of industrial fuel equipment can be obtained through Flinn & Dreffeln Co. Bulletin Bc-82.

Carburizer

Modern is the furnace and modern is the catalog which describes it. Hevi Duty Electric Co. has an exceptionally well-written, well-illustrated, and artistically printed booklet on the Hevi Duty carburizer which uses the Carbonol process. Bulletin La-44.

Firebrick

Babcock & Wilcox make an insulating firebrick which is refractory as well as insulating and can be used without a facing of firebrick. Description, applications, and engineering data are contained in Bulletin Fy-75.

Abrasive Cleaning

Comprehensive information on airless abrasive metal cleaning is contained in a book on the "Wheelabrator." Tum-Blast, a patented mechanical device made by the American Foundry Equipment Co. Bulletin Fa-112.

Columbium

"Advantages of Columbium in Wrought 4 to 6 Per Cent Chromium Steel" is the title of a booklet which gives detailed test data to prove its advantages. Bulletin Cc-16.

Properties of Nickel

Another very informative bulletin "Engineering Properties of Nickel" has been made available by the International Nickel Co., Inc. Bulletin Dc-45.

Lectromelt Furnaces

The story behind lectromelt furnaces is well told in this 48-page booklet issued by the Pittsburgh Lectromelt Furnace Corporation. Tells of development of this type furnace and describes recent improvements. Bulletin Db-18.

Welding Instructions

Primarily concerned with methods of showing welding on drawings by the American Welding Society's new symbol system, an attractively bound 81-page booklet entitled "Welding Instructions and Standards, Part I" has been published by the United States Steel Corp. Subsidiaries. Bulletin Cb-79.

High Frequency

The well-known Ajax-Northrup electric furnaces are excellently catalogued in a 22-page book, which covers all sizes and types for laboratory or shop. Includes illustrations, diagrams, tables and charts. Ajax Electrothermic Corp. Bulletin Ia-41.

Neophot

"Neophot" is the name of a metallograph of radically different design and universal adaptability. A pamphlet distributed by Carl Zeiss, Inc., gives its applications and features and is well illustrated with beautiful samples of micrographic work. Bulletin Jx-28.

Chromel

A catalog has been issued by Hoskins Mfg. Co. covering Hoskins electric furnaces and Chromel elements, which provide uniform heat and automatic temperature control with excellent production and quality of work. Bulletin Ia-24.

Global Elements

Global Pin Type Non-Metallic Electric Heating Elements and Terminal Rods and Global "AT" Type Non-Metallic Electric Heating Elements are explained and illustrated in two recent booklets issued by the Global Division of the Carborundum Company. Bulletin Lb-25.

Galvanizing

An informative, historical, simple digest of galvanizing forms a guide to longer life for iron and steel products. This handsome, handy, 24-page book beautifully printed in color is distributed by American Hot Dip Galvanizers Association. Bulletin Ea-167.

Are Welding

A well illustrated and comprehensive 20-page booklet giving the story of the new arc welding technique made available by the Lincoln "Shield Arc" Welder with self-indicating dual continuous control is described in a booklet published by the Lincoln Electric Co. Bulletin Cc-10.

Annealing and Hardening

Annealing and hardening with SC atmosphere furnaces is dealt with in a new folder by the Surface Combustion Corp. Bulletin Cc-51.

Pure Metals

Pure carbide-free metals are described and applications suggested in a pamphlet published by Metal & Thermit Corp., who make pure tungsten, chromium and manganese in addition to the ferro-alloys. Bulletin Ma-64.

Tool Steel Selector

A wall chart, 30 x 20 in., to be used as a means for selecting the proper type of tool steel is offered by Carpenter Steel Co. to tool steel users in the U.S.A. only. Bulletin Jz-12.

Easy Flow Brazing

Handy & Harman's Easy-Flow Brazing Alloy, a recent development, is recommended for joining stainless steel and iron, Monel metal, Inconel, Everdur and other ferrous and non-ferrous metals. Briefly described in Bulletin Ny-126.

Bristol Potentiometers

All of the Pyromaster Round-Chart Potentiometers manufactured by the Bristol Company are described in a new bulletin which explains the simple operating characteristics of Bristol's Pyromaster. Bulletin Nb-87.

Laboratory Service

A new edition of "The Metal Analyst" tells about an organization established by Adolph I. Buehler specializing in the installation of metallurgical laboratories. The complete line of laboratory equipment marketed by Buehler is also catalogued. Bulletin Dy-135.

Heat Treating Guide

A convenient guide for heat treating Columbia Tool Steels is now available. This device with revolving index shows grades, types, analyses, heat treating temperatures and Rockwell hardnesses. Bulletin Cc-115.

Cadalyte '38"

A new technical service manual on CADA-LYTE '38" for cadmium plating has been issued by the Electroplating Division of du Pont. Cites recent improvements and changes in the product, and gives detailed operating instructions and methods of analyses. A table of costs and time required for specified deposits is included. Bulletin Gb-29.

Heat Treat Chart

Heat treaters everywhere should find a heat treating wall chart complete with S.A.E. specifications a very valuable addition to their shops. Published by Chicago Flexible Shaft Co., manufacturers of Stewart industrial furnaces. Bulletin Ka-49.

Aluminum Finishes

Good printing, good paper, spiral binding and an attractive presentation add interest to the valuable technical information on "Finishes for Aluminum" contained in Aluminum Co. of America's new booklet. Bulletin Oy-54.

Laboratory Furnace

The Sentry Co. describes a high temperature tube combustion furnace. It permits operating temperatures up to 2500° F., thus offering greater speed and precision for combustion analysis or other laboratory procedures. Bulletin My-114.

Hydrazing

Hydrazing work is completely described in recent literature released by Lindberg Engineering Co. Points out advantages in particular applications. Bulletin Bc-66.

Hardness Testing

A 4-page folder which has as its purpose "to give you an idea of how practical a thing it is to make hardness tests on raw stock or fabricated metal parts in all plants where metal is worked, and to suggest something of the necessity for making such tests, or at least their importance" is available through the Wilson Mechanical Instrument Co., Inc. Bulletin Fb-22.

Ampco Metal

The six grades of Ampco metal, varying in hardness and physical properties but all possessing wear resistance, tensile strength and corrosion resistance, are described in a booklet which also lists its uses in modern industry. Bulletin Ka-175.

Tool Steel Guide

A 36-page booklet which gives a clear picture of the entire range of tool steels and their fields of use, plus a systematic method for selecting the right steel for the purpose, is being released by Bethlehem Steel Co. Bulletin Bc-76.

Commercial Heat Treating

Commercial heat treating in Pittsburgh as practiced by the Pittsburgh Commercial Heat Treating Company is described in literature available through that organization. Bulletin Bc-81.

Stainless Data Book

All users of stainless and heat resisting alloys should find invaluable the information contained in a booklet published by Maurath, Inc., giving complete analyses of the alloys produced by the different manufacturers, along with the proper electrodes for welding each of them. Bulletin Jy-125.

Lubrication Improvements

Intensive research which completed important improvements in the field of heavy-duty gear and bearing lubrication is tabulated in a new 12-page illustrated bulletin just released by D. A. Stuart Oil Co., Ltd. Bulletin Lb-118.

Recuperators

Results obtained with Carborundum Company's recuperators using Carbofraz tubes are fuel savings, closer temperature control, faster heating, and improved furnace atmosphere. Complete engineering data are given in Bulletin Fx-57.

Seamless Tubes

Prepared by the Timken Steel and Tube Division of Timken Roller Bearing Co. is a "Guide for Users of High Temperature Steels," which presents technical data relating to the various properties of Timken seamless tubes. Bulletin Bb-71.

Mo-W High Speed

J. V. Emmons, metallurgist for Cleveland Twist Drill Co. and largely responsible for the development of the molybdenum-tungsten high speed steels known as Mo-Max, has prepared a general description of these new steels. Bulletin Ka-103.

Hardness Testers

A handy thing to have around for anyone who does much hardness testing is a complete and detailed catalog of the universal line of hardness testers carried by Pyro-Electro Instrument Co., together with information on various specialized pieces of auxiliary equipment. Bulletin Fb-197.

Bright Annealing

Various types of electric and fuel-fired furnaces built by the Electric Furnace Co. for bright-annealing wire, tubing, strip and other products are described in a new 8-page folder. Bulletin Lb-30.

Heroult Furnace

Revised and expanded to include modern major innovations in the construction and operation of the Heroult electric furnace, a new edition of the American Bridge Co.'s Heroult Electric Furnace Bulletin is now ready for distribution. Bulletin Bb-124.

Heat Resisting Alloys

Authoritative information on alloy castings, especially the chromium-nickel and straight chromium alloys manufactured by General Alloys Co. to resist corrosion and high temperatures, is contained in Bulletin D-17.

Ni-Cr Castings

Compositions, properties, and uses of the high nickel-chromium castings made by The Electro-Alloys Co. for heat, corrosion and abrasion resistance are concisely stated in a handy illustrated booklet. Bulletin Fx-32.

Ingot Production

"The Ingot Phase of Steel Production" is the title of a book defining the principles of quality ingot production followed by many well-known steel manufacturers. Gathmann Engineering Co. Bulletin Ka-13.

Testing with Monotron

Shore Instrument & Mfg. Co. offers a bulletin on Monotron hardness testing machines which function quickly and accurately under all conditions of practice. Bulletin Jc-33.

Duronze III

A technical bulletin covering Duronze III, a patented high strength silicon-aluminum bronze, has just been released by the Bridgeport Brass Co. Describes typical uses and shows comparative tables. Bulletin Ac-163.

Furnaces

Two booklets, of 27 and 30 pages respectively, catalog, illustrate and fully describe the line of "Electric Heat Treating Furnaces" and "Fired Furnaces, Ovens and Kilns" built by Hicroft & Company. Bulletin Cc-203.

Defi Rust

Analysis and descriptive notes of nine types of heat and corrosion resisting steels made by Rustless Iron and Steel Co. are contained in a handsome folder. Bulletin Ha-169.

The Review

7016 Euclid Ave., Cleveland

Please have sent to me without charge or obligation the following literature. (Circle the numbers that interest you. It is important to write in your company or business connection when you return this coupon.)

Name Title

Company

Company Address

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Dc-100	Dc-180	Jy-4	Bc-67
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Dc-29	Dc-148	Oy-46	La-44
Dc-170	Dc-148	Ny-8	Fy-75
Dc-154	Dc-56	Hb-63	Fa-112
Dc-3	Cb-184	Cb-19	Cc-16
Dc-110	Dc-96	Ca-100	Cc-16
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Db-18	Jz-12	Fb-22	Lb-30
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Ia-41	Nb-87	Bc-76	D-17
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Ia-24	Cc-115	Jy-125	Ka-13
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Ea-167	Ka-49	Fx-57	Ac-163
Cc-10	Oy-54	Bb-71	Cc-203
Cc-51	My-114	Ka-103	Cc-203
Ma-64	Bc-66	Fb-197	Ha-169

In Memoriam

RUN down by an automobile as they were crossing the street, CHARLES B. MURRAY and his wife were killed on March 25. Murray, who was 72, was president and treasurer of Crowell & Murray, Inc., chemists, mining engineers and metallurgists with offices in Cleveland.

Mr. Murray received his bachelor of science degree from Worcester Polytechnic Institute in 1887. In recognition of his achievements, the Institute on the 50th anniversary of his graduation in 1937 awarded him an honorary doctor of engineering degree.

Upon graduation he became assistant chemist with the Joliet Steel Co. in Joliet, Ill. After working for several other steel companies, he was appointed chief chemist and metallurgist at the Johnson works of the then Carnegie Steel Co. in 1893.

He formed his own commercial laboratory in Pittsburgh in 1904 and continued there three years before coming to Cleveland to form his concern with Crowell. He was actively connected with the company until his death.

Mr. Murray was active in many engineering organizations, including the A.S.M., American Society for Testing Materials, American Institute of Mining and Metallurgical Engineers, American Chemical Society, Society of Chemical Industry, Iron & Steel Institute, Lake Erie Mining Institute, and Cleveland Engineering Society.

PORTER WILLIAM SHIMER, who died last December at the age of 82, is an important name to metallurgists in the Lehigh Valley district of Pennsylvania.

When Shimer graduated from Lafayette College, Easton, Pa., in 1878 with the degree of Mining Engineer, chemical and metallurgical laboratories were rare adjuncts to steel plants. As the first chemist to be employed by the Thomas Iron Co., Porter Shimer made rapid progress in analysis of ore and pig iron.

After one year he became associated with Prof. T. M. Brown of Lafayette in a private laboratory, where he remained until 1885.

He then opened his own private laboratory, and in 1910 took into partnership his son, Edward B. Shimer. Another son, W. R. Shimer, is a metallurgical engineer at Bethlehem Steel Co. Mr. Shimer's two most important contributions to metallurgy are considered by his son to be the invention of the carbon combustion crucible and of a new case hardening process.

When the combustion crucible was invented, the only other methods for determining carbon in steel were the inaccurate color method and the solution method which was very slow and could not be used for open-hearth control purposes.

It was during the War that the shortage of sodium cyanide and potassium cyanide led Shimer and Son to their important researches resulting in an entirely new process for case hardening patented in 1918. A distinct improvement was made in 1927 and in 1928 the patents and business were sold to American Cyanamid Co.

For his significant contributions to the chemistry and metallurgy of steel, Porter Shimer was awarded numerous honors by engineering societies.

ANTHONY HOENSHEID, 79, died suddenly of a heart attack while returning from a vacation in Florida.

"Tony" Hoensheid served his apprenticeship as a toolsmith in Essen, Germany. His first job in America was with the H & N Nail Works in Cleveland. From there he moved to Tiffin, Ohio, with National Machinery, then to

Whitman & Barnes in Akron. In 1903 he became connected with the Detroit Twist Drill Co., where he remained until a few years ago.

For the past four or five years he has been more or less retired, acting in a consulting capacity for his son Ralph, president of the Commercial Steel Treating Corp., Detroit.

He was one of the pioneers in satisfactory furnaces for heat treating high speed steel. A lot of the good work being conducted with furnaces today can be traced back to some of the work that Tony did with a couple of furnace builders in Detroit.

He had a host of friends in Detroit and among the various cutting tool manufacturers throughout the country for he had always been very energetic in anything new that came out concerning the treatment of tool steel and was always willing to show what he was doing and offer suggestions to anyone who asked for help.

Tony was one of the original group of 18 who met at the Fellowcraft Club and organized the Steel Treating Club—fore-runner of the A.S.M.

—W. P. Woodside

ROWLAND S. LE BARRE, 61, of the Detroit office of Republic Steel Corp., died Sunday, March 26.

Mr. Le Barre was born in Ontario. He joined the Illinois Steel Co. in the late nineties, went to New Orleans for that firm in 1902, and then in 1905 to the Cleveland office of Carnegie Steel Co. and Illinois Steel Co., where he later became assistant sales manager.

In 1919 Mr. Le Barre became general manager of alloy steel sales for the old Interstate Iron & Steel Co. In 1924 he opened the Detroit office of Interstate and headed it until the company was taken over by Central Alloy and later by Republic Steel Corp. Since then, he had been in the Detroit sales office of Republic.

PHILADELPHIA Chapter lost one of its prominent members with the death of VICTOR HYBINETTE, president of Hybnickie Alloys Co. SVEN HYBINETTE will become a member of the Philadelphia Chapter in his place.

Impetus to Nickel Given by Canadian Ore Discovery

By A. F. Holden

New Haven Chapter—C. A. Crawford, development and research division of the International Nickel Co., Inc., presented a very interesting talk at the March 16th meeting. He covered the very broad field in which nickel is or can be used.

Nickel was known to antiquity and in fact was used in some of the ancient coins. Little progress was made in its metallurgy until about the middle of the last century.

Previous to then its presence in cuprous nickel sulphide ores made it valuable for high strength bronzes although the reason for the good properties was not known.

Nickel has only come into its own through applied research during the past 50 years. The discovery of the large Canadian ore fields gave the impetus which has led to the universal use of the metal today in stainless alloys, heat resisting castings, copper-nickel alloys and almost unlimited other applications.

The "Chromium Throated Quartette" of the New Haven Chapter is looking forward to a competitive songfest with the Providence, R. I., "Monotone Quartette" at the New England Regional Meeting to be held in Springfield, May 26.

Here and There With A.S.M. Members

STARTING as a chemist at American Steel & Wire Co.'s Central furnaces and docks in Cleveland during



H. B. Jordan

his college vacation in the summer of 1914, HARVEY B. JORDAN has moved right up through the ranks and has now been appointed vice-president of the company.

Jordan majored in industrial engineering at Penn State College.

When he joined American Steel & Wire permanently in 1915 he was employed as clean up foreman. Subsequent positions were as first general foreman, assistant superintendent and superintendent of the plant. In 1933 he was transferred to the vice-president's office doing field work. He then became manager of the metallurgical department, manager of the Cleveland district, and in Jan. 1937 was named assistant vice-president. As vice-president Mr. Jordan will be in charge of operations.

for the Tremont Nail Co., a subsidiary. He is a past chairman of the Boston Chapter A.S.M., and is currently serving a three-year term as a member of the A.S.M. Handbook Committee.

Mr. Baxter's new responsibilities will include the control of inspection for materials and mechanical specifications. He has been with United for eight years; prior to that he was metallurgist for Rhode Island Tool Co., Providence.

He is a member of the Boston Chapter Executive Committee.

METAL cutting and welding with city-gas-oxygen torches; recent advances in the use of prepared gaseous atmosphere furnaces; and new heat treating processes which have come over the horizon in the past year are the three subjects singled out for study and analysis during 1939 by the Ferrous Metals Committee, Industrial Gas Section, American Gas Association. New Chairman of the group is CLAYTON S. CRONKRIGHT, Public Service Electric and Gas Co. of New Jersey.



C. S. Cronkright

Mr. Cronkright chaired the New Jersey Chapter A.S.M. in 1937-38, and has been active in that group ever since its organization ten years ago.



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CHAPTER CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Baltimore	May 15	Engineers Club	George B. Waterhouse	Some Pioneers in Metallurgy
Boston	May 8			Cast Iron
Buffalo	May 11	Hotel Buffalo		Annual Meeting
Calumet	May 9	Woodmar Country Club, Hammond, Ind.	H. B. Knowlton	Failures in Service
Chicago	May 11	Medinah Club	Robert Sergeson	Metallurgical Services From the Standpoint of the Supplier
Cincinnati	May 11	Hotel Alms	R. G. Roshong	Practical Application of Heat Treating Processes
Cleveland	May 1	Cleveland Club	R. S. Archer	Service Failures
Columbus	May 20	The Trees		Annual Picnic
Dayton	May 10	Engineers Club	R. G. Roshong	Practical Applications of Heat Treating Processes
Detroit	May 8	Hotel Fort Shelby		Free Machining Steels (Symposium)
Hartford	May 9	Arrow-Hart & Hegeman Electric Co.	A. P. R. Wadlund	X-Rays and Their Applications
Indianapolis	May 15	Washington Hotel		Round Table Discussion
Lehigh Valley	May 5	Hotel Trolley, Allentown, Pa.	H. W. McQuaid	Current Theories of Abnormality in Steel
Los Angeles	May 12	Athletic Club	W. P. Woodside	Panorama of Alloys in Steel
Mahoning Valley	May 9	Elks Club, Youngstown	L. D. Woodworth	Open Hearth, Bessemer and Mills
Milwaukee	May 11	Milwaukee Athletic Club	E. J. Carey	Living Machines
Montreal	Apr. 24	Windsor Hotel	D. H. Reynolds	Uses of X-Ray in Metallurgy
Muncie	May 18		C. H. Cherry	Electrical Heat in Short Cycle Malleableizing
New Haven	May 18	Hammond Laboratory, Yale University	R. S. Williams	Bearing Materials
New Jersey	May 15	Essex House, Newark	I. I. Sikorsky	Materials for Aircraft Construction
New York	May 8	2 Park Ave.	V. N. Krivobok	Sauveur Night
North West	May 11	Minnesota Union, Univ. of Minn.		Annual Meeting
Notre Dame	May 10	Engineering Auditorium, Univ. of Notre Dame	W. E. Mahin	Tool Steel Consumer Problems
Ontario	May 5	Hamilton	V. E. Lysaght	Hardness Testing of Metals
Oregon	May 12	Congress Hotel, Portland	S. H. Graf	Non-Destructive Testing
Philadelphia	May 19			Middle Atlantic Chapters Meeting (see page 1)
Pittsburgh	May 11	Roosevelt Hotel	W. F. McGarrity	Hot Rolled and Cold Rolled Reduced Sheet Steel
Puget Sound	May 3	Engineers Club, Seattle, Wash.	R. Reynolds	Aluminum in Navy Aircraft
Rochester	May 8	Lower Strong Audit., Univ. of Rochester	E. W. Moore L. C. Marshall	Tools and Tool Steels
Rockford	May 17	Elks Club	W. R. Breeler	Developments in High Speed Steels
Saginaw Valley	May 9	Durant Hotel, Flint, Mich.	J. H. Friedman	Upset Forgings
Springfield	May 15	Hotel Worthy	F. B. Foley	Stainless Steels
St. Louis	May 19	York Hotel	F. R. Palmer	New Ideas in the Heat Treatment of Tool Steel
Syracuse	May 9		Joseph Winlock	Metallurgy and Shotwelding of Stainless Steel
Texas	May 10	Kelly's Cafe, Houston		Annual Meeting
Tri-City	May 9	Hotel Fort Armstrong, Rock Island	J. H. Zimmerman	Flame Heat Treating
Washington	May 8	Garden House, Dodge Hotel	B. Stoughton	Plastic Deformation
Worcester	May 10	Sanford Riley Hall, Wor. Polytech. Inst.	A. A. Bates	Modern Trends in Metallurgy

Employment Service Bureau

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SALES REPRESENTATIVES: To sell nationally known line of heat resisting and stainless steel castings. Commission basis only. In reply advise lines you are now handling, district covered and your previous business experience and technical training. Box 4-5.

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EXPERIENCED PYROMETER MAN for New York and Philadelphia, capable of producing and supervising district sales and service. Unlimited opportunity with growing organization. Proper remuneration. Box 4-15.

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HEAT TREATER: University of Michigan junior in metallurgical engineering desires summer employment as a practical heat treater or laboratory assistant. Four years practical experience in commercial and industrial heat treating establishments. Experienced in operation of all types of furnaces as well as testing equipment. Box 4-25.

SALESMAN: B.S. in business administration, 1924. Seven years experience selling and designing fabricated steel structures. Also experience in other lines. Employed for past five years by large finance company. Desires of getting back into steel sales. Box 4-30.

YOUNG ENGINEERING GRADUATE, 31, desires connection with manufacturer of industrial equipment as sales promotion manager. Experience in technical and in various advertising activities for promoting sales to industrial men through publicity. Box 4-35.

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Comparative Membership Standings of the Chapters

The following list shows the relative membership as of April 1 of the various chapters of the American Society for Metals. The actual membership of each chapter is not given, the figures merely representing the number of members each chapter has less than the chapter listed next above. The numbers in parentheses indicate the relative position of each chapter last month.

(1) Chicago	..... Largest	(24) Tri-City	..... 2
(2) Pittsburgh	..... 34	(25) Washington	..... 12
(3) Detroit	..... 104	(26) North West	..... 12
(4) Cleveland	..... 68	(30) Schenectady	..... 2
(5) Philadelphia	..... 53	(31) Dayton	..... 2
(6) New York	..... 178	(32) Oregon	..... 2
(7) New York	..... 18	(33) Columbus	..... 2
(8) Boston	..... 75	(34) Baltimore	..... 2
(9) Montreal	..... 32	(35) St. Louis	..... 2
(10) Ontario	..... 7	(36) York	..... 2
(11) Milwaukee	..... 16	(37) Syracuse	..... 2
(12) Los Angeles	..... 12	(38) Indianapolis	..... 2
(13) Rochester	..... 10	(39) Rhode Island	..... 2
(14) Lehigh Valley	..... 3	(40) Mahoning Valley	..... 2
(15) New Haven	..... 15	(41) Penn State	..... 2
(16) Texas	..... 10	(42) Springfield	..... 2
(17) Cincinnati	..... 2	(43) Notre Dame	..... 2
(18) Peoria	..... 8	(44) Southern Tier	..... 2
(19) Golden Gate	..... 8	(45) Puget Sound	..... 2
(20) Hartford	..... 18	(46) Muncie	..... 2
(21) Buffalo	..... 2	(47) Rockford	..... 2
(22) Calumet 17	(48) Mich. Col. M. Y. 2
(23) Worcester 1	(49) Mo. Schl. M. 2
(24) Canton-Mass. 5	(50) Va. Poly. Inst. 2

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